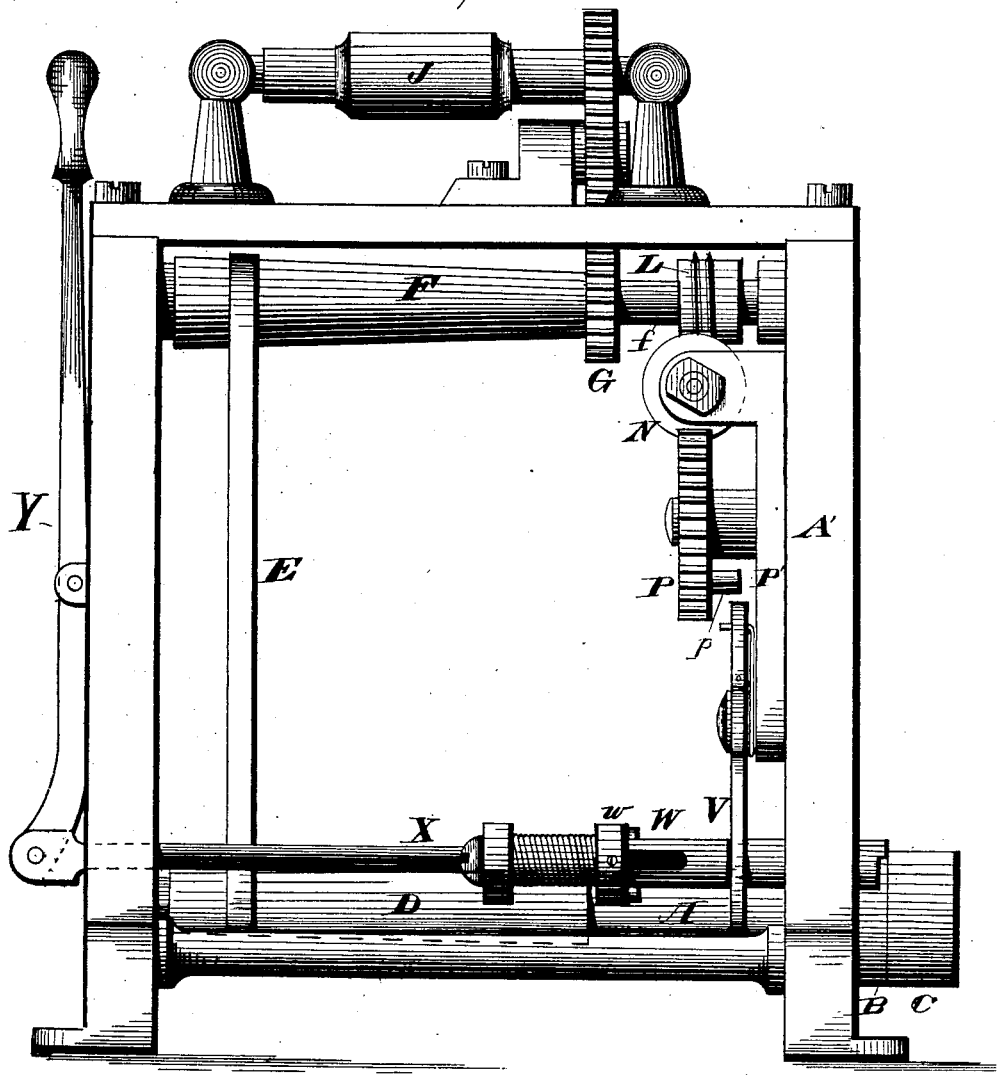
3 Sheets—Sheet 1.

B. SAUNDERS.

COMBINED REGISTER AND STOP-MOTION FOR SPINNING MACHINERY.

No. 192,391. Patented June 26, 1877.

Fig. 1.



WITNESSES

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3 Sheets—Sheet 2.

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Fig. 2.

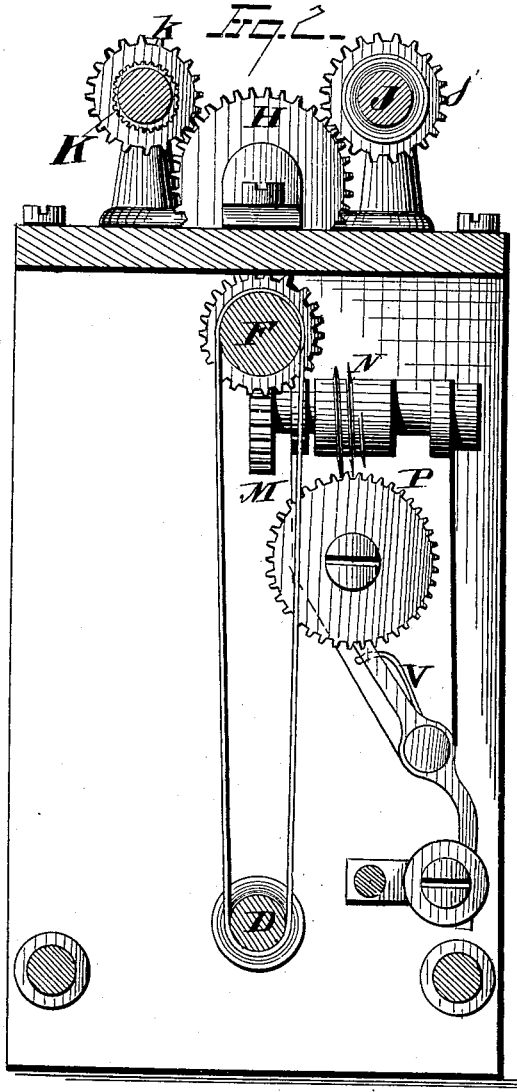


Fig. 3.

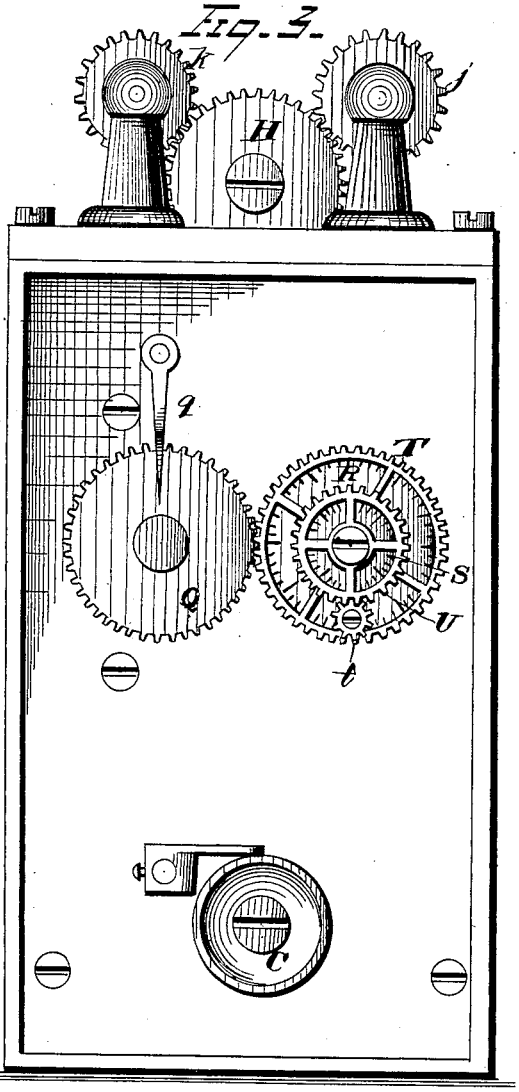
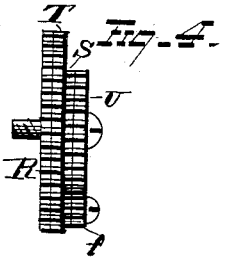


Fig. 4.



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3 Sheets—Sheet 3.

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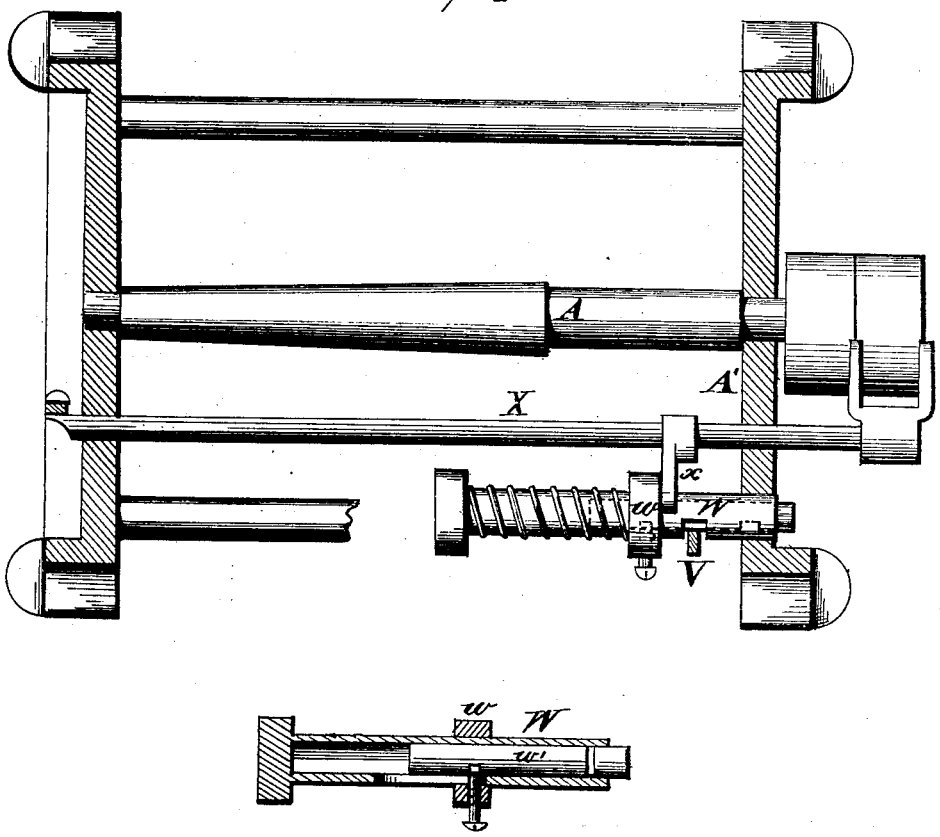
Fig. 5.



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UNITED STATES PATENT OFFICE

BENJAMIN SAUNDERS, OF NASHUA, NEW HAMPSHIRE.

IMPROVEMENT IN COMBINED REGISTER AND STOP-MOTION FOR SPINNING MACHINERY.

Specification forming part of Letters Patent No. **192,391**, dated June 26, 1877; application filed March 3, 1877.

To all whom it may concern:

Be it known that I, BENJAMIN SAUNDERS, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Drawing-Frames in Spinning Machinery; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to certain improvements in drawing-frames in spinning machinery; and consists in a combined measuring and stop-motion mechanism, provided with or without a registering device, and adapted for the exact measurement of a predetermined number of yards of drawing, the same constructed and operating as follows in description and claims.

It shows the measurement of drawing for each one thousand yards, when a stop is then automatically made to arrange or govern the numbers of yarn in the next one thousand yards of drawing, and, so continuing, any measurement of drawing can be determined.

The present mode of evening the numbers of yarn after reeling or measuring is by doubling and drawing after passing it through the railway-head, while my improvement dispenses with all unnecessary doublings for evening, and only requires drawing sufficient for the straightening of the staple. In this way I both obtain a stronger and more uniform thread, and also produce a saving in machinery, labor, and time.

Referring to the drawings, Figure 1 is a view, in side elevation, of a machine embodying my invention. Fig. 2 is a vertical transverse section of the same, and Fig. 3 an end elevation. Fig. 4 shows the registering mechanism in detail. Fig. 5 is a plan view with upper portion of the frame removed, showing the band-shifting mechanism.

Any suitable frame-work may support the several parts of the machine, in which A is the main actuating-shaft in the lower rear portion of the frame, and having its power end projecting from the end A′ of the latter, to which are attached, respectively, the tight and loose pulleys B C. Power transmitted to the tight pulley drives the conical speed-pulley D, secured to the shaft within the frame, which, by means of band E, operates the second cone-pulley, F, the shaft of which latter revolves the driving spur-gear G.

An intermediate spur-gear, H, communicates motion to the drawing-rollers J and K, journaled in upright bearings on the top of the frame. These constitute the drawing-frame proper, and elongate the spongy slivers as they come from the carding-engine, straightening the filaments and laying them parallel to one another.

The roller J, which the staple first traverses, has a plain smooth surface, while the delivery drawing-roller K is longitudinally fluted. The driving-pinion *k* of the latter is of smaller diameter than the pinion *j*, which revolves the first or receiving roller J, and, as the intermediate gear H actuates them both, the roller K is, of necessity, driven faster than the roller J, and thus produces the drawing requisite to straighten the staple.

I thus dispose of all the doubling mechanism, and only draw the slivers sufficiently to lay each fiber past the next one, thus placing them parallel to one another, and obtaining a strong and uniform thread. While the drawing is thus carried forward the number of yards produced registers itself, and at each measurement of a determined number of yards the drawing is automatically stopped in order to regulate the number of yarns.

This is accomplished as follows: A worm or endless screw, L, upon the shaft *f*, between the driving-spur G and the end A′ of the main frame, engages with a worm-wheel, M, the shaft of which latter has a second worm, N, which, in turn, meshes with a second worm-wheel, P. These several worms and their engaging-wheels constitute a gear-train, to communicate motion under a constantly-decreasing rate of speed from the driving-shaft *f* to this last-named worm-wheel P, and they are all preferably secured to a supporting-plate, P′, attached to the inner side of the end frame A′, at which the power is first applied to the actuating-shaft A.

The gear P is secured to a shaft passing through the end frame A′, and bearing on its outer extremity the graduated disk-wheel Q, the graduations of which are numbered, so that, in relation to the connecting gear-train which rotates it upon its shaft, one revolution of the disk will measure off one thousand yards of drawing.

An index-finger, *q*, is secured to the frame above the said disk, and accurately points to the respective graduations on the same. To one side of the disk Q there is secured to the outer side of the end frame a fixed cogged disk, R, having a tubular supporting-spindle, to the outer portion of which a smaller cog-disk, S, approximately one-half the diameter of R, is secured. Between the two an index-wheel, T, of equal diameter with disk R, is loosely placed, so that it may have free rotation on the spindle-hub, while over the small cog-disk S a second loose index-wheel, U, corresponding in diameter to S, is placed, the whole being secured to the frame by a screw-bolt or other suitable engaging mechanism. To the side periphery of index-wheel T a small pinion, *t*, is secured loosely, which meshes with the cogs on the peripheries of both disk S and wheel U, and is of dimension relative to them that one revolution of its carrying-wheel T causes it to revolve the small index-wheel U one-fiftieth of a revolution. The fixed disk R and loose wheel T mesh with cogs on disk Q, and as the latter makes one revolution the wheel T also is revolved once over the fixed disk R, while its pinion *t* causes the second small loose wheel U to make one-fiftieth of a revolution over the small fixed disk S. The two fixed disks R and S are each graduated with fifty points or indices, and small fingers on the inner peripheries of their corresponding index-wheels T and U accurately mark the extent of each of the latter's revolution. The graduated disk Q, under one revolution, measuring off one thousand yards of drawing, turns the index-wheel T once around, and the latter, through its pinion *t*, marks one point on the graduated disk S, and thus any number of thousands of yards can be registered thereby.

At each drawing of a thousand yards the drawing is automatically stopped by connecting mechanism, which ships the power-belt from off the tight to the loose pulley on the main driving-shaft A. This is as follows: To the inner-face periphery of worm-gear P a stud, *p*, is secured, which is adapted to operate a tripping-lever, U, pivoted below gear P, and which is pressed by a spring, which tends to cause its lower extremity to engage in a slot cut in a lower shaft, W, which latter has an interior sliding bolt, W′, which is secured to a collar, *w*, sliding on the outer side of said shaft W.

This collar is spring-pressed, so as to be constantly urged in a line of direction toward the end frame A′, and thus operate the belt-shifter X by means of its engaging-stud *x*, to throw the belt from the tight to the loose pulley of shaft A. In setting the machine in operation the belt-shifter, by its hand-lever Y, places the belt over the tight pulley, and at the same time draws the spring-pressed collar *w* back against its spring, so as to allow the lower end of the tripping-lever V, under the urgency of its spring, to be placed in front of the sliding bolt within the tubular shaft W, and thus effectually prevent the recession of collar *w* in line of travel toward end frame A′.

In this way the power-belt is kept on the tight pulley till the worm-wheel P, carrying stud *p*, makes one revolution, when the latter operates the spring-pressed tripping-lever V, withdrawing it from its recess in shaft W, and disengages the sliding bolt, so that the collar *w* throws the shifter X in line of direction of end frame A′, and ships the belt over onto the loose pulley.

The drawing-rolls then cease to turn, and opportunity is given to arrange and govern the members of yarn to be passed over the same. When this is determined, power is again shifted to the tight pulley and the operation is repeated, another thousand yards being drawn out.

The self-registering mechanism is only added as a supplemental feature, and does not constitute the main characteristic of my improvement, so that it may be used or not without affecting the principle of my invention; but in actual practice I preferably use it.

For the sake of description I have represented the stop-motion mechanism as operating at the drawing of each one thousand yards; but this number is merely arbitrary, and in place of such a predetermined number of yards in measurement any number may be substituted, and the drawing-rolls be automatically stopped on measuring off such a number of yards.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the drawing-frame and the joint measuring and stop-motion mechanism, of the reverse conical band-pulleys, the main driving-shaft, and the intermediate gearing, all constructed and operating substantially as described.

2. The combination, with the drawing-frame and the joint measuring and stop-motion mechanism, of the registering device secured on the outer side of the frame, the same consisting of the double series of cogged disks suitably indexed, and operated by the gear-wheel revolving on the stop-motion shaft, substantially as described.

3. In a drawing-frame adapted to stop with any predetermined measurement of drawing, the combination, with the band-shifter, the sliding collar, and intermediate engaging-stud,

of the spring-pressed tripping-lever, substantially as described.

4. In a drawing-frame, the combination, with the joint measuring and stop-motion mechanism, of the tripping-lever, the band-shifter, and the intermediate engaging parts, substantially as described.

5. In a drawing-frame adapted to stop with a predetermined drawing, the combination, with the tripping-lever, the spring-pressed collar, and the band-shifter operated thereby, of the sliding bolt rigidly connected to the said collar, and engaging with the tripping-lever, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 28th day of February, 1877.

BENJAMIN SAUNDERS. [L. S.]

Witnesses:
A. H. SAUNDERS,
L. A. SAUNDERS.